

What is claimed is:

1. A phonetic data processing system comprising:
  - A. a computer processing device having access to a memory;
  - B. a rich semantic grammar (RSG) stored in said memory and comprising one or more grammars comprising syntactic information and semantic information; and
  - C. a phonetic data processing module, executable by said processing device, said module comprising:
    - (1) a phonetic searcher, configured to generate, as a function of said RSG and a received phonetic stream comprised of phonetic estimates, a set of sequences comprising a set of best words from said RSG corresponding to said phonetic estimates; and
    - (2) a semantic parser module, configured to generate a set of semantic data from said sequences and said RSG, wherein said set of semantic data includes all valid interpretations of the sequences.
2. A system as in claim 1, wherein each of said sequences comprises set of words combined to define word paths.
3. A system as in claim 1, wherein said phonetic searcher is configured to extract a context free grammar (CFG) comprising syntactic information from said RSG and is further configured to access said CFG to generate said set of best words.

1 4. A system as in claim 1, wherein each of said phonetic estimates has a fixed start time  
2 and a plurality of end times, and wherein there is a score associated with each end time  
3 corresponding to the likelihood that a given phonetic estimate is a word or a syllable in  
4 said RSG.

1 5. A system as in claim 4, wherein said phonetic searcher includes a grammar builder  
2 configured to selectively combine words from said set of best words into sequences, as  
3 a function of the start time and end times of said phonetic estimates corresponding to  
4 said words.

1 6. A system as in claim 5, said phonetic searcher is configured to combine said words  
2 using dynamic programming.

1 7. A system as in claim 1, wherein said RSG is a grammar tree comprising nodes having  
2 certain of said syntactic and semantic information associated with each of a plurality of  
3 said nodes.

1 8. A system as in claim 1, wherein said semantic information includes one or more  
2 categories, and each category dictates an interpretation of a corresponding word.

1 9. A system as in claim 1, wherein said semantic information includes one or more  
2 operators, and each operator defines a manner of combining a plurality of words.

10. A system as in claim 1, further comprising:

- (3) an application program, configured to receive said set of semantic data and to define context information associated with said phonetic stream;
- (4) a semantic evaluator, configured to interpret said set of semantic data in accordance with said context information and to derive a linguistic result therefrom.

11. A system as in claim 10, wherein said set of semantic data is represented as a tree of nodes representing all valid interpretations of said word sequences and said semantic evaluator is configured to determine a category at each node, as a function of said context information, and to apply to values at each node a corresponding category to determine said linguistic result.

12. A system as in claim 1, wherein said set of semantic data is a semantic tree comprised of a set of nodes representing all valid interpretations of said sequences.

13. A method of processing phonetic data, comprising:

- A. defining in a memory a context free rich semantic grammar (RSG) comprising syntactic and semantic information;
- B. receiving a phonetic stream comprising phonetic estimates;
- C. generating a set of sequences comprised of best words, as a function of said RSG and said phonetic stream;

7 D. generating, from said sequences and said RSG, a set of semantic data including  
8 all valid interpretations of said sequences.

1 14. A method as in claim 13, wherein each of said sequences is comprised of a set of words  
2 combined to define word paths.

1 15. A method as in claim 13, wherein said phonetic searching includes extracting a context  
2 free grammar comprising syntactic information from said RSG.

1 16. A method as in claim 13, wherein said phonetic searching includes:  
2 (1) determining for each of said phonetic estimates a fixed start time and a plurality  
3 of end times; and  
4 (2) determining a score associated with each end time corresponding to the  
5 likelihood that a given phonetic estimate is a word or a syllable in said RSG.

1 17. A method as in claim 16, wherein said phonetic searching further includes:  
2 (3) combining said words from said set of best words into said sequences, as a  
3 function of the start time and the end times of said phonetic estimates  
4 corresponding to said words.

1 18. A method as in claim 16, wherein said phonetic searching includes:  
2 (3) combining said words using dynamic programming.

- 1 19. A method as in claim 13, wherein said RSG is a grammar tree comprising nodes having  
2 certain of said syntactic and semantic information associated with each of said nodes.
- 1 20. A method as in claim 13, further including:  
2 E. defining a context associated with said phonetic stream by an application  
3 program; and  
4 F. interpreting said set of semantic data with a semantic evaluator, in accordance  
5 with said context, and deriving a linguistic result therefrom.
- 1 21. A method as in claim 20, wherein interpreting said set of semantic data includes, for  
2 each node, determining a category at a given node, as a function of said context, and  
3 applying said category to interpret values at said given node.
- 1 22. A method as in claim 13, wherein generating said set of semantic data includes  
2 generating a semantic tree instance comprised of a set of nodes representing all valid  
3 interpretations of said sequences.
- 1 23. A phonetic searcher, coupled to a database comprising a context free grammar  
2 including syntactic information, and configured to receive a phonetic stream of data and  
3 to generate a word list representing all valid words represented by said phonetic stream,  
4 as a function of said RSG.
- 1 24. A grammar builder coupled to a database comprising a context free grammar, including

2 syntactic information, and coupled to a database comprising a set of valid words  
3 corresponding to a stream of phonetic estimates, wherein each of said phonetic  
4 estimates is represented as having a fixed start time and a plurality of end times, and  
5 wherein said grammar builder is configured to selectively combine words from said set  
6 of words as a function of said fixed start time and said end times of phonetic estimates  
7 corresponding said words to be combined.

1 25. A grammar builder as in claim 24, wherein for each phonetic estimate, a score is  
2 associated with each of said end times, and wherein said score is related to a probability  
that said phonetic estimate is a certain word or syllable from said context free grammar.

26. A semantic parser coupled to a database having a context free rich semantic grammar  
(RSG) and configured to generate a set of semantic data as a function of a set of word  
sequences and said RSG, wherein said sequences include words derived from a  
phonetic stream and said RSG, and said set of semantic data includes all valid  
interpretations of the sequences.

1 27. A semantic parser as in claim 26, wherein the RSG is a grammar tree comprised of a  
2 plurality of nodes, one or more of said nodes including syntactic information and  
3 semantic information.

1 28. A semantic parser as in claim 26, wherein said set of semantic data is a semantic tree.

1 29. A semantic tree evaluation tool coupled to an application program that defines a context  
2 and coupled to a memory including a semantic tree representing all valid interpretations  
3 of a phonetic stream, said evaluation tool configured to generate a linguistic result as a  
4 single valid interpretation of said phonetic stream, in accordance with said context.

1 30. A semantic evaluation tool as in claim 29, wherein said semantic tree is comprised of a  
2 plurality of nodes including semantic information, and wherein said semantic evaluation  
3 tool is configured to determine at each of said nodes a category, as a function of said  
4 context, and to apply to values at each node a corresponding category to determine said  
5 linguistic result.

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